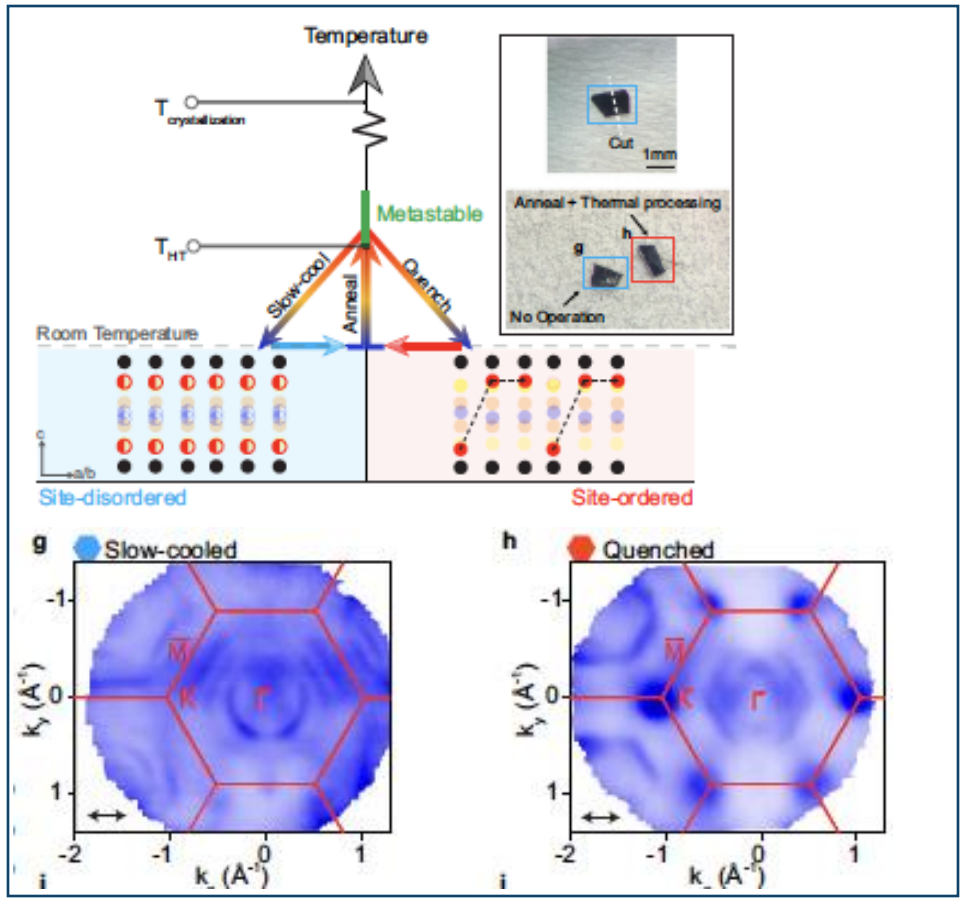
Reversible Non-Volatile Electronic Switching in a near-Room-Temperature van der Waals Ferromagnet



Depending on growth condition, $Fe_{5-\delta}GeTe_2$ can be cooled into site-disordered or site-ordered structure phases, which leads to dramatically different electronic structures.

Work was done, in part, at the Center for Integrated Nanotechnologies.

Scientific Achievement

The observation of reversible and non-volatile switching between two stable and closely related crystal structures in the near-room-temperature van der Waals ferromagnetic $Fe_{5-d}GeTe_2$.

Significance and Impact

Demonstration of the concept that vacancy-induced order-disorder phases can be utilized to change the topological character of electronic structure. Consideration of the symmetries of these phases may open up various routes towards realizing spintronics applications.

Research Details

- We performed angle-resolved photoemission spectroscopy experiments to measure the electronic structures.
- We performed density functional theory simulations to obtain the electronic structures to understand ARPES results.

Wu, H., et. al. Reversible Non-Volatile Electronic Switching in a near-Room-Temperature van Der Waals Ferromagnet. *Nature Communications* **2024**, *15* (1).